REMARKS/ARGUMENTS

Please note that the Applicant will provide formal drawings, if required, upon receipt of a Notice of Allowance.

The present application is a continuation of United States Patent Application Number 09/932,088 (the "parent application") which has been allowed. Claims 1-21 correspond to the originally filed claims of the parent application. Accordingly, claims 1-21 have been cancelled and new claims 22-44 have been added.

No new matter has been entered by this amendment.

Please note that claims 1-21 have been cancelled without prejudice in order to expedite prosecution of this application. The Applicant reserves the right to pursue these cancelled claims in a continuing application or otherwise.

During prosecution of the parent application, the Examiner rejected claims 1-6, 8, 9, and 14-20 of that application under 35 U.S.C. 102 as being anticipated by United States Patent No. 6,416,186 to Nakamura ("Nakamura"). In addition, the Examiner rejected claims 7 and 11 of the parent application under 35 U.S.C. 103(a) and being unpatentable over Nakamura.

The Applicant has carefully reviewed Nakamura and believes that it neither teaches nor suggests the invention defined in new claims 22-44. Accordingly, the Examiner is respectfully requested to consider new claims 22-44 in view of the following comments.

The Applicant's invention provides a method, system, computer program product, and article having a computer readable modulated carrier signal for inverting detail-in-context presentations. On the other hand, Nakamura is directed toward a projection display unit that corrects image distortion. Thus, the function of Nakamura is fundamentally different than that provided by the Applicant's invention. While the method described in Nakamura may be appropriate for projector image correction, the Applicant believes that the Nakamura method yields incorrect results for the case of detail-in-context presentation inversion. As such, Nakamura may be considered as a teaching away from the method of the Applicant's invention.

In particular, while image projection for a projector such as an LCD projector as described in Nakamura and detail-in-context presentations using distortion functions such as described by Carpendale (Carpendale, Marianne S. T., *A Framework for Elastic Presentation Space* (Burnaby, British Columbia: Simon Fraser University, 1999)) both involve the use of perspective projection, the respective projections are distinct and serve different functions. A detail-in-context presentation is not invertible in the general case using the Nakamura projector correction method and such a presentation is fundamentally different from that of Nakamura. In fact, the method described in Nakamura, while correct for the case of projector output image correction, actually yields an incorrect result for the inversion of a detail-in-context presentation. This is illustrated in Figure A1 enclosed and is explained in more detail below. Furthermore, the initial approximation point **Z3** shown in FIG. 5 of Nakamura is not coincident with point P_i (i.e., P_0 **160** in FIG. 1 of the present application) of new claim 22. In addition, the subsequent steps of the inversion method of new claim 22 are different from those described by Nakamura.

First consider the simple case shown in Figure A1 (enclosed) in which the optical axis of a projector (shown at the top of the figure) is collinear with a line from the viewer to the center of the output image. This is similar to FIG. 4 of Nakamura but is a simpler case in that the projector axis and reference viewing line to the image center are collinear. Now, define initially the point **R** on the image output surface (such as a liquid crystal display (LCD)) through **A-A'** and normal to the page for the projector, through which light rays from the projector pass onto the ultimate projection surface **D**, which may be taken as a non-planar surface in general. **D** represents a projection surface for the LCD projector to project onto, and is distorted above the desired projection surface **B-B'** so as to be closer to the projector than desired. To allow direct comparison with a detail-in-context presentation, the same surface **D** shall be used to represent the distortion surface for a detail-in-context presentation such as defined by Carpendale. Thus, in Figure A1, the surface **D** may represent the simple case of a detail-in-context lens with focus (i.e., F **133** in FIG. 1 of the present application) centered on the optical axis. Note, however, that the detail-in-context point displacement vector from a specific point on the reference plane (through **B-B'** normal to the diagram) to the corresponding displaced point on **D** is not in the general case parallel to the optical axis, nor is it generally parallel to the line from the viewpoint to the point to be inverted.

Now, consider the point **R** on the image output surface. The projector projects **R** onto point **X** on surface **D**. Ideally, if **D** were an ideal undistorted surface at the desired projection distance, it would be coincident with **B-B'**. However, since **D** is closer to **A-A'**, the distance from **R** to the optical axis through **Z-Z1** is less than desired, and qualitatively to the viewer, a line from **R** to the optical axis projected onto **D** would be shorter than desired. This is a similar shortening effect to that seen, for example, when a slide projector is moved closer to a projection screen. To correct for this effect, the method in Nakamura correctly (for the purpose of projector image adjustment) repositions point **R** to the point $\mathbf{R}^{\mathbf{N}}$ at a greater distance from **Z.** $\mathbf{R}^{\mathbf{N}}$ now projects to a position on the projection surface corresponding to the desired projected length, and the viewer sees the desired image size.

However, while appropriate for the projector image output correction, $\mathbf{R}^{\mathbf{N}}$ is not the inversion point required to invert point **X** in a detail-in-context presentation. Rather, the correct inversion of such a presentation corresponds to computing the point $\mathbf{P}_{\mathbf{n}}^{\mathbf{PDT}}$ on **B-B'**, or its corresponding point $\mathbf{R}^{\mathbf{PDT}}$ on **A-A'**, such that the detail-in-context displacement of $\mathbf{P}_{\mathbf{n}}^{\mathbf{PDT}}$ yields point **X** on **D**, seen as point $\mathbf{R}^{\mathbf{PDT}}$. (Generally, in a detail-in-context presentation, planes **A-A'** and **B-B'** are coincident, but in Figure A1, they are shown separated, for clarity and for comparison with Nakamura.) As shown in Figure A1, $\mathbf{R}^{\mathbf{PDT}}$ and $\mathbf{R}^{\mathbf{N}}$ are not coincident; the method of Nakamura would compute a correction that increases the distance **R-Z** rather than decreasing it. Such an increase is certainly appropriate as the correction of a projector image, but does not yield the desired detail-in-context presentation inversion point $\mathbf{R}^{\mathbf{PDT}}$, which falls between **R** and the optical axis. The computation in Nakamura is also generally different with respect to magnitude to that desired for inverting a detail-in-context presentation and does not take into account detail-in-context presentation capabilities such as detail-in-context folding as describe by Carpendale.

Enclosed Figure A1 further shows that the Nakamura initial approximation point **Z3** is not the same as the initial detail-in-context inversion point approximation **P** (i.e., P_0 **160** in FIG. 1 of the present application) of the Applicant's method. **Z3** is on the optical axis **Z-Z1**, but the Applicant's initial approximation starts from the off-axis point **P**, and subsequent approximations proceed as new points $\mathbf{P}_{\mathbf{i}}$ on the line **B-B'** perpendicular to the optic axis rather than along the optical axis. Furthermore, the length along the optical axis corresponding to **Z-Z3** that is adjusted to give new tentative reference surfaces in Nakamura is actually not an adjustable variable within

a given detail-in-context presentation since the distortion function **D** and the viewing frustum height are predetermined.

Referring to FIG. 1 of the present application, it is illustrative to review a representation of a more typical detail-in-context presentation. In this case, the lens **130** is not located on the optical axis of the viewing frustum **120** and has also undergone folding (as described by Carpendale) such that the "viewer aligned vector" F_0-F **131** describing the direction of displacement of the image points towards **D** has been tilted away from the viewpoint RVP **140**. In this case, the method of Nakamura is clearly inapplicable, since it deals only with the magnitude and inclination of the distortion surface or physical surface **D** itself, whereas the displacement direction for a detail-in-context presentation also needs to be considered for correct inversion, such as is accomplished by the Applicant's method.

In view of the foregoing, and in summary, the Applicant believes that new claim 22 is patentable over Nakamura. The Applicant further believes that new claims 23-36 being dependent on claim 22 are also patentable over Nakamura.

Please note that new claims 37-38, 39-40, 41-42, and 43-44 for a system, a computer program product, an article having a computer readable modulated carrier signal, and a method for determining distance, respectively, have been added. These claims are directed toward embodiments that implement the method of claims 22-36 and are supported by pages 8-9 of the specification, FIG. 6, and by original claims 20 and 21. The Applicant believes that new claims 37-44 are also patentable over Nakamura.

The Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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